

The Knowledge Bank at The Ohio State University

Ohio State Engineer

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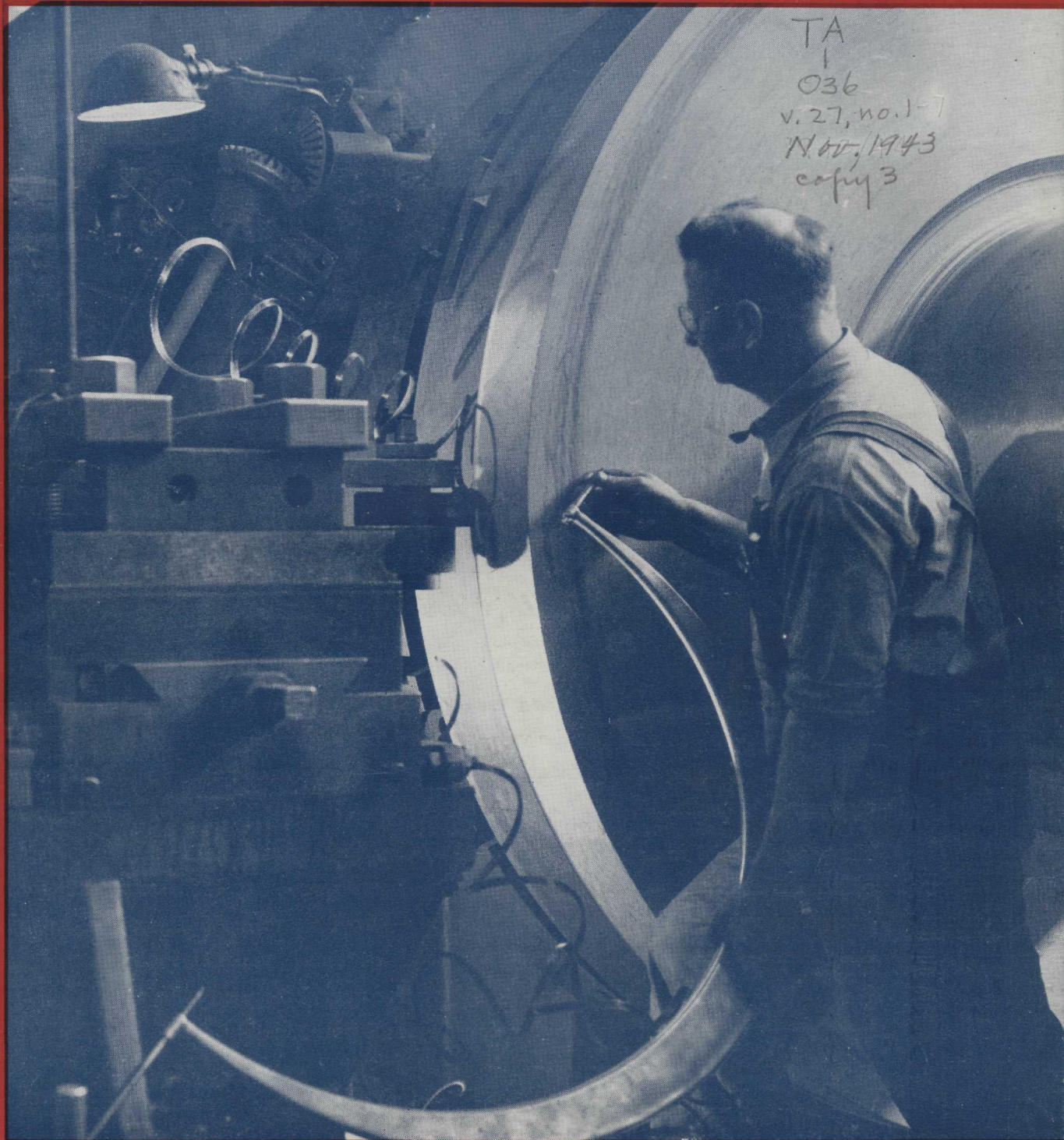
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OHIO STATE ENGINEER

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SPECIAL A.S.T.P. ISSUE
THE ARMY GOES TO COLLEGE



THE FUTURE WILL BE YOUR RESPONSIBILITY!

learn to know your Bearings NOW

American colleges turn out good engineers. That's why so many of the world's greatest engineering achievements stand to America's credit.

The world of the future will be a world of wheels and wings to an extent that cannot be completely foreseen now. But one thing is sure—it will be a world of bearings, too, for wherever wheels or shafts turn, they must turn on bearings.

It is not too much to say, in view of their present dominant position, that it

will be a world of Timken Tapered Roller Bearings; for there is no bearing requirement that Timken Bearings cannot meet.

So, while you are still studying, learn to know your Timken Bearings thoroughly—their design, application and potentialities. Then you'll be still better equipped for your job when college days are over and you take up the responsibilities of a full-fledged engineer. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

The Rubber Plant

**with roots
two miles deep!**

THE MAKING OF synthetic rubber involves among other things the exact control of gas mixtures of great complexity. Formerly the analysis of some gases required several days of painstaking laboratory work, and in some cases a complete analysis was impossible.

Westinghouse scientists—working in close collaboration with engineers of leading oil and chemical companies—have perfected an electronic “chemist” which is an important addition to the present methods of analysis.

With the improved technique and apparatus now available, the time required for accurately making some of these analyses has been reduced to an hour or less!

An amazing electronic device . . . known as the mass spectrometer . . . not only improves the accuracy of the synthetic rubber process, but frees hundreds of skilled chemists from tedious but important production testing in these vital plants.

The mass spectrometer analyzes gases by sorting the molecules—according to their mass—in (roughly) the same way that a cream separator sorts out the cream from whole milk.

Let's say we want to analyze a simple gas mixture containing one part of oxygen and 10,000 parts of nitrogen. Here's how the mass spectrometer accomplishes this incredible feat:

First, the gas sample is bombarded

with electrons. This ionizes the nitrogen and oxygen molecules, giving them electrical charges of their own.

These ions are then drawn by electrical force into a curved vacuum tube. Here, ions of different molecular weights whizz around different curved paths—depending upon their reaction to a powerful electromagnet surrounding the tube.

The heavier oxygen ions follow a straighter path than the lighter nitrogen ions and are directed through a tiny exit slit onto a plate where they give up their electrical charge. The amount of this charge, amplified and recorded by sensitive electrical instruments, is an extremely accurate measure of the quantity

of oxygen in the gas mixture.

The starting voltage is then changed to allow the nitrogen ions to pass through the same exit slit—thus measuring the quantity of nitrogen. This same principle applies to the analysis of complex hydrocarbon mixtures.

The development of the mass spectrometer . . . for the quick, accurate analysis of butadiene . . . is a typical example of the way Westinghouse “know how” in electronics is tackling the wartime problems of industry in an effort to speed victory.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pennsylvania.



Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

November, 1943

Page 1
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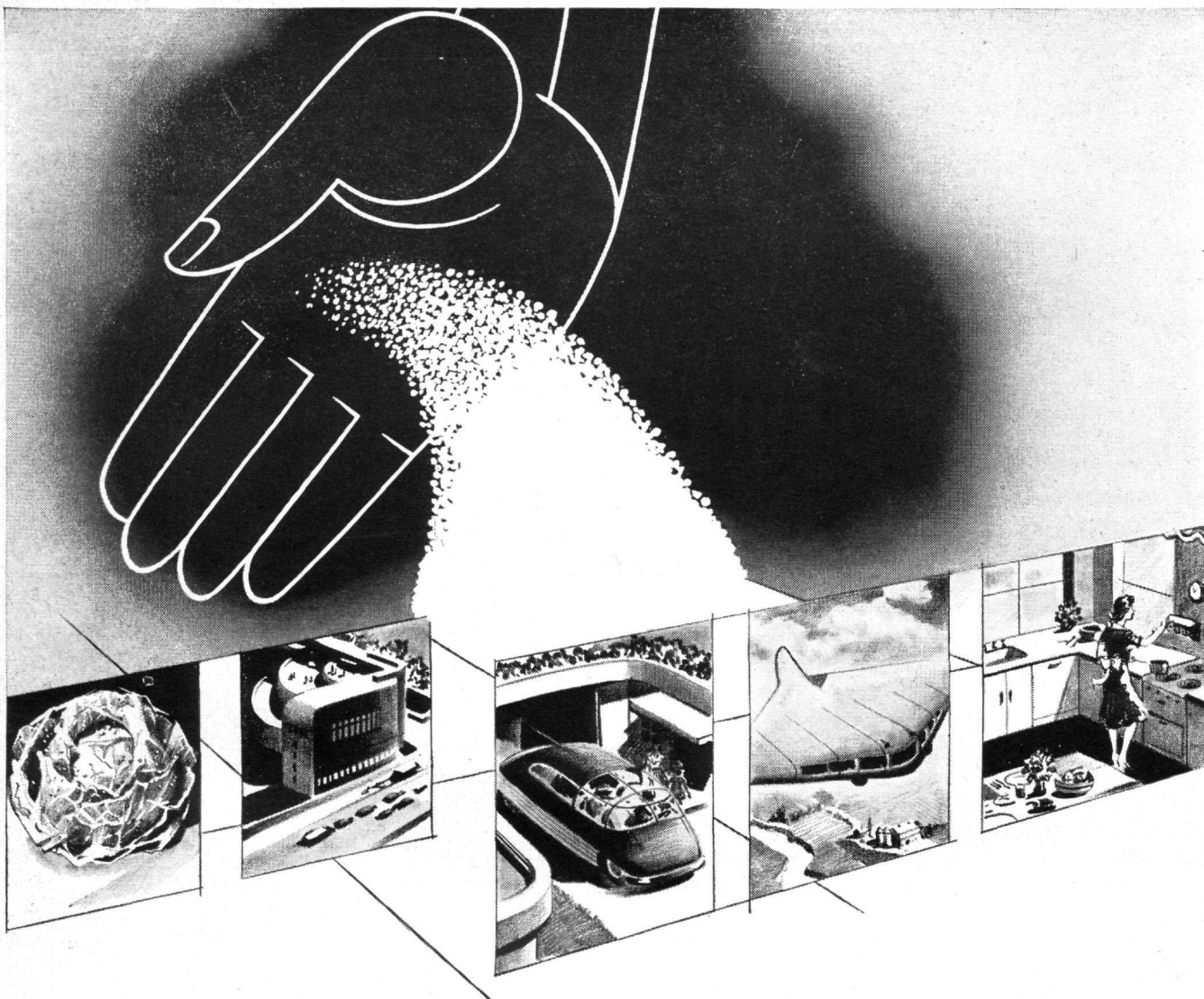
TO THE UTTERMOST ENDS OF THE EARTH

And so, the roads lead away to the uttermost ends of the earth . . . to the South Seas of Captain Cook and Admiral Halsey . . . to the Orient of the Great Khan and General Chiang Kai-shek . . . to the England of Wellington and Churchill. Along every mile of those roads you will find American boys reading American newspapers and magazines . . . "including all the ads, three times"; and American books . . . "right out of their covers."

It's a long road that has no turning, and turn these roads surely will . . . to bring our victorious warriors home to the most wonderful land they will see in all their travels. The doctrine of the divine right of kings is no longer accepted; and the age of unbridled autocracy—the day of irresponsible and ruthless force—is rightfully condemned. The new generation is coming up, inspired with a broader understanding of the world and of human justice—which will lead the people along the roads of intelligence and four-fold freedom for all.

In town and country you see these happy leaders of the new world—pedalling their bikes along the roads with laughter and eager chatter—exploring the endless wonders of the woods and the fields—winning hard-fought but fair and friendly contests on the sandlots. Brimming with healthy curiosity, they demand to know, these boys and girls: "What? Why? When? Where? Who? What does Kettering say? Compton? What is the air-distance?" Engineers, here's a coming new market that demands your best!

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PLASTICS—products of industrial initiative

Plastics are a stimulating source of inspiration for architects and industrial designers in search of new ideas. When these intriguing materials are released from their military commitments, innumerable applications for the home from will arise. No products offer a better example of how progress can be accomplished when industry is given free rein to its initiative.

As a producer of basic chemicals needed for the manufacture of plastics, Dow is in a particularly fortunate position to promote their development. Three major Dow plastics—Styron, Ethocel and Saran—have already been produced.

They possess distinctive properties that permit a bewildering array of uses in almost every field of human activity. There are also varieties of Dow plastic materials for coatings, finishes and other purposes in the electrical, textile and many other industries.

These plastic products do more than supplant other materials. They are veritable points of departure that lead to fresh fields. When normal conditions return, self-reliant industry, expanding on its own resources, will develop and apply them for the greater well-being of all America.

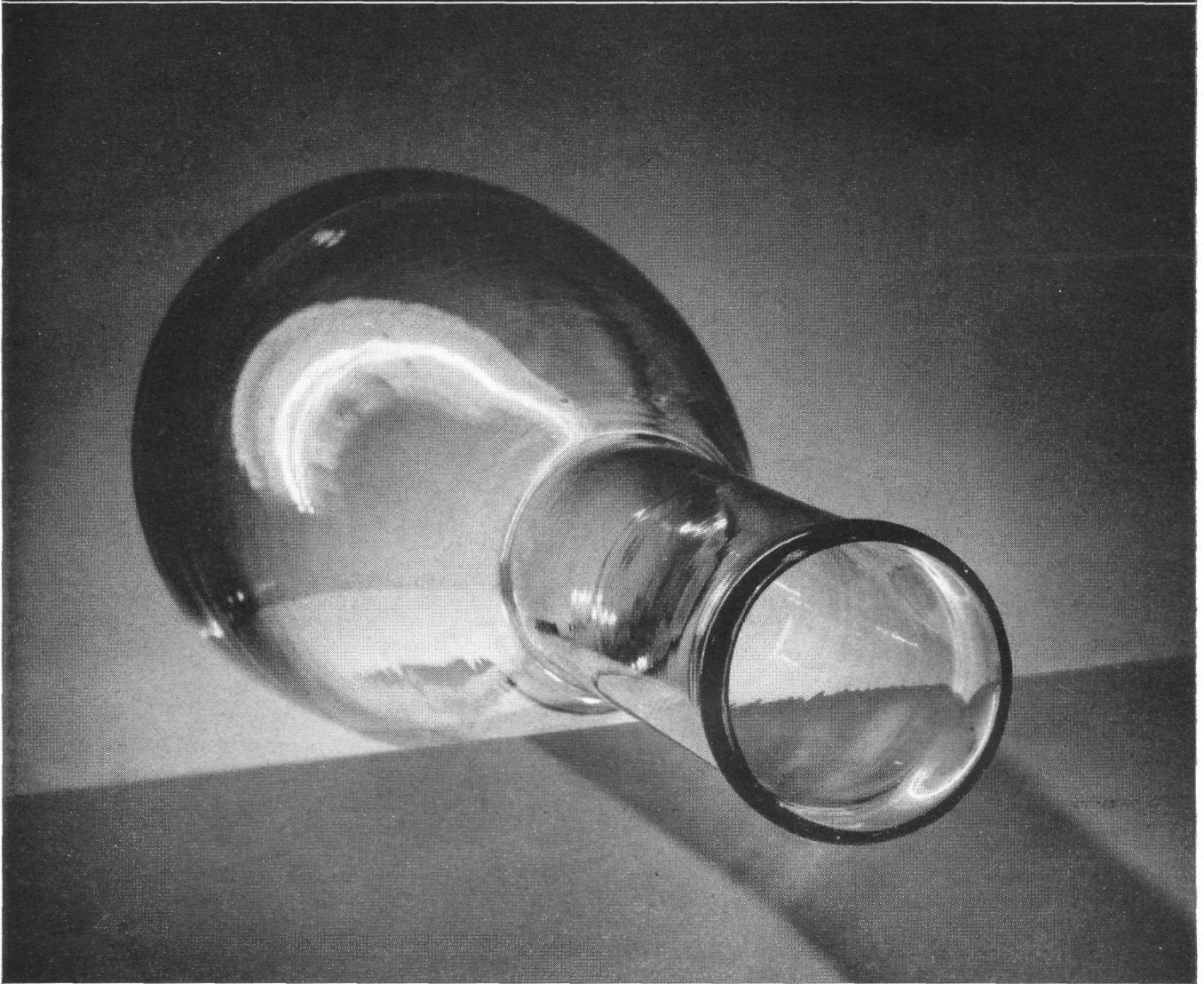
THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

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**CHEMICALS INDISPENSABLE
TO INDUSTRY AND VICTORY**

Submarine hunt in the Chemung Valley...



NO, it isn't a gun or a new style bomb. It's all we can show you of a special glass tube that is part of our secret submarine listening apparatus.

The same kind of tubes are used in listening devices that can pick up the menacing hum of an enemy plane miles away. And they're made out of special glass, to exacting requirements, by skilled Corning workmen in the peaceful Chemung Valley in Southern New York State.

Did we say "peaceful"? That isn't exactly correct. No subs actually prow the Chemung, but there's plenty of war-like activity going on at Corning Glass Works, just as in every glassworks in the whole United States.

For Corning, like other glassmakers, was ready to turn its skill and experience

to our country's use before the smoke had cleared at Pearl Harbor. For example, since World War I, Corning has developed medical and chemical glassware that frees this nation from dependence on foreign imports. This material is now flowing in a steady stream to industry, hospitals, and laboratories.

Hundreds of other items are made by Corning to aid the war effort. Optical glass, insulators for planes and tanks and ships, heavy glass parts for the manufacture of explosives, even glass precision gauges (ring, plug and others). Many of these jobs represent new uses for glass, where glass replaces metals because it is strong, resistant to wear and corrosion, and fairly plentiful. After the war many of these uses will stay, and new ones will be added

because glass is a material of endless possibilities. And then, as now, Corning will be the center of American glass research.

In your own future as an engineer, *keep your eye on glass!* Corning Glass Works, Corning, New York.

CORNING
— means —
Research in Glass

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The OHIO STATE ENGINEER

Vol. XXVII

November, 1943

No. 1

TABLE OF CONTENTS

O
S
E

Frontispiece	6
Welding Design and Construction.....	7
The Engineer's Bookshelf.....	10
Radar	11
As the Curtain Falls.....	13
Tau Beta Pi Essay.....	14
The Army Goes to College.....	15
ASTP on the Campus.....	17
Energy-Creating Machine	34

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Our Cover

The tolerance on this 11½-foot, 25-ton shaft is held to 0.0005 inches. It is to be used as a drive shaft to transmit 75,000 h.p. from a hydro-turbine to a generator.—*Courtesy Westinghouse.*

Our Frontispiece

Radio antenna of KDKA at Allison Park, Pennsylvania.—*Courtesy Westinghouse.*

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